

[DOCUMENT] CLAIMS

[Claim 1]

A nanosize heater-mounted nozzle comprising:

5 a nozzle for locally supplying a source gas toward a substrate; and

a nanosize heater for heating the source gas, located in the vicinity of an opening of the nozzle.

[Claim 2]

10 The nanosize heater-mounted nozzle according to Claim 1, wherein the nanosize heater is composed of carbon nanotube.

[Claim 3]

15 The nanosize heater-mounted nozzle according to Claim 1 or 2, wherein the nozzle is formed of an electrically insulating material, and a pair of electrodes is located on a side face of the nozzle, and the nanosize heater is connected between the electrodes so as to pass over the opening of the nozzle.

[Claim 4]

20 The nanosize heater-mounted nozzle according to Claim 3, wherein the nozzle is formed of quartz or heat-resistant glass.

[Claim 5]

25 The nanosize heater-mounted nozzle according to Claim 3, wherein the electrodes are formed of a material having a melting point of 1,700 degree-C or higher.

[Claim 6]

A method for forming a micro thin film including steps of:

30 positioning the nanosize heater-mounted nozzle,

according to one of Claims 1 to 5, closely to a surface of a substrate;

locally supplying a source gas toward the substrate through the nanosize heater-mounted nozzle; and

5 heating the source gas around an opening of the nozzle while energizing the nanosize heater.

[Claim 7]

A method for manufacturing a nanosize heater-mounted nozzle including steps of:

10 partially heating a tube formed of an electrically insulating material to shape a tapered nozzle by drawing;

forming a pair of electrodes on a side face of the nozzle; and

15 connecting a nanosize heater between the electrodes so as to pass over an opening of the nozzle.

[Claim 8]

The method for manufacturing a nanosize heater-mounted nozzle, according to Claim 7, further including a step of evaporating a conductive portion between the electrodes by
20 supplying a current between the electrodes, after forming the pair of electrodes on the side face of the nozzle.

[Claim 9]

The method for manufacturing a nanosize heater-mounted nozzle, according to Claim 7, further including a step of
25 irradiating with an electron beam the portion connected between each of the electrodes and the nanosize heater, after connecting the nanosize heater between the electrodes.